TÉCNICO
UNIVERSIDADE
DE LISBOA

INVISION

INTRODUCTION

Vision is one of the most relied-upon human senses, central to how we perceive, navigate, and interact with the world. Blindness and visual impairment encompass a broad spectrum of conditions — from partial sight loss to complete absence of light perception — affecting an estimated 2.2 billion people worldwide. Causes include congenital disorders, degenerative diseases (glaucoma, macular degeneration), diabetes, trauma, and age-related decline. The resulting disabilities extend far beyond inability to see, profoundly impacting mobility, access to information, employment, and overall independence.

2,2 Billion

People affected worldwide

~45 Million

Totally blind worldwide

Faced with the scale and complexity of visual impairment's impact on daily life, we were presented with a hardware and software challenge that we embraced wholeheartedly: to create a solution that could genuinely improve the lives of the millions of people navigating indoors with limited or no vision.

PROBLEM

Independed Access

Blind and low-vision individuals face major mobility barriers when navigating unfamiliar environments such as university campuses, museums, hospitals, and public transit stations alone, often relying on help from other people to be able to know where their desired destination is.

Limited Tools

While current navigation tools help reduce disorientation outdoors, they rarely support independent exploration, provide contextual information, or create engaging experiences, often relying on the establishments installing the techology. This doesn't allow the blind individuals to truly be able to go everywhere they want and know which direction to take, what room they about to enter, where the room they want is, etc. without asking for help.

SOLUTION

Using glasses equiped with a camera, speaker, microphone and a connection with an open source AI that we will modify and specialize in image analysis and in giving directions in order to provide low-vision individuals contextual information, allowing them to navigate and explore different establishments independently.

How it works?

The user asks a question, saying a keyword, the question must begin with “Óculos”, followed by the question, finishing with “obrigado.”. Then, the glasses take a photo through the camera of what the user is looking at and sends it to the AI along with the question. The AI interprets the photo and reads the text in it (if there is any text in the photo) and gives an audible response to the user with valuable information.

Example:

User asks “Óculos, what classroom is this, obrigado?”.

↓

Glasses convert speech to text and take a photo.

↓

↓

Glasses send the image, the question, and a previously meticulously created prompt to ensure the quality of the response to the software.

↓

AI interprets the image, reads the text, and sends a text response to the glasses. Then the message is converted to an audio: “That’s classroom 113, and the door is to your right.”.

TARGET AUDIENCE

Direct Beneficiaries

Blind Individuals: Individuals who rely entirely on auditory and tactile feedback. The glasses provide a "computer vision" layer to translate the environment into real-time audio cues.

Low Vision Individuals: People with significant visual impairment who struggle to identify low-contrast obstacles, steps, or indoor signage.

Indirect Beneficiaries

Caregivers & Families: Provides peace of mind and reduces the constant need for physical supervision, knowing the user has an extra layer of safety.

Facility Managers & Businesses: Shopping malls, airports, museums, and hospitals aiming for Universal Design compliance and true social inclusion.

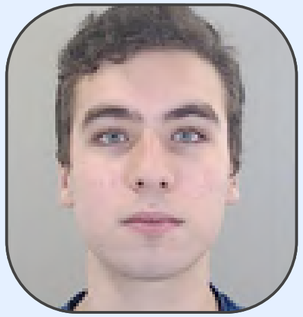
COMPETITORS

Wayfindr: Provides guidelines for audio-based navigation systems to help visually impaired people navigate complex environments like transport hubs using smartphones and beacons.

NaviLens: Uses high-contrast QR-style codes that can be scanned from a distance to give users audio informationabout locations directions

Be my Eyes: Is an app that connects the user to voluntaries or AI through live video calls and photo analysis. It uses the smartphone camera to allow volunteers to provide real-time verbal assistance with tasks like reading labels, navigating, or identifying items.

TEAM



JOSÉ SANTOS

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RICARDO LOURENÇO

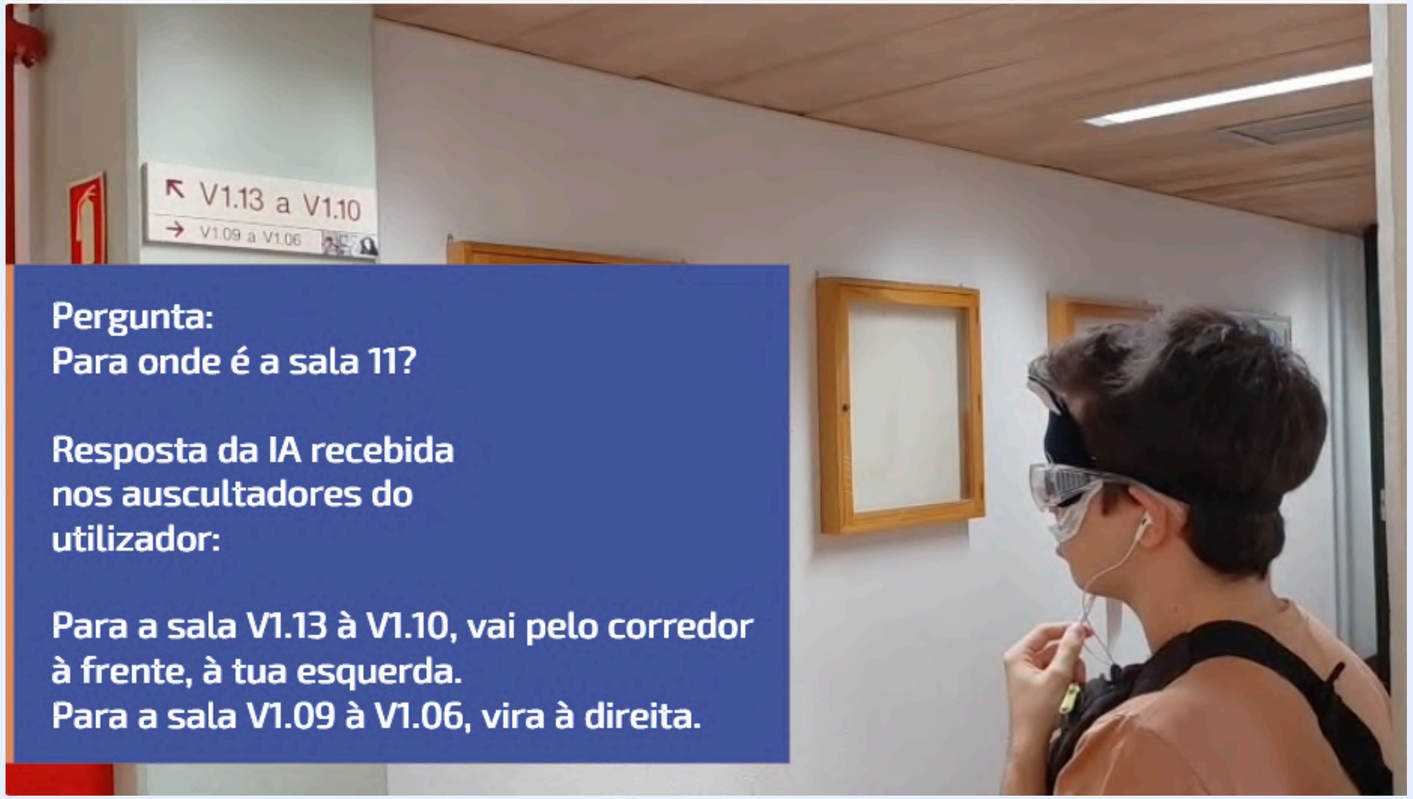
IDERLEY COSTA

PEDRO VILHENA

ALBERTO LEITÃO

RESULTS

To validate our prototype, we conducted hands-on testing by wearing a blindfold and relying solely on the system's audio responses. Across key scenarios, results were consistently accurate and reliable.
When asked about the location of specific objects, the system delivered responses that were simple, direct, and precise. When directed towards points of interest — such as restrooms, staircases, and elevators — the system consistently provided clear, actionable guidance, demonstrating real potential to enhance the independence of blind and low-vision individuals in everyday environments.



In the example above, we asked:

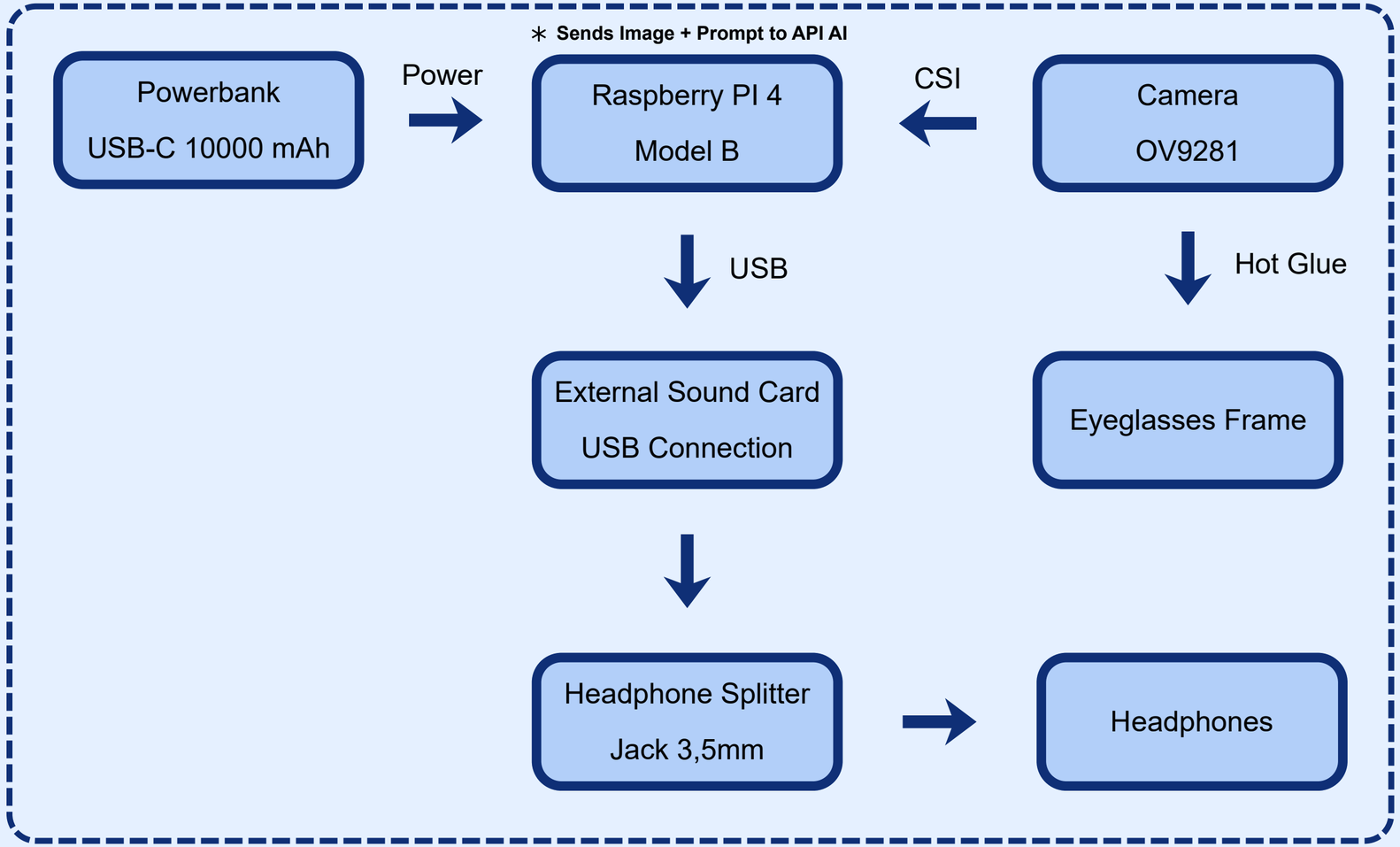
“Where is room 11?”

The output we received was:

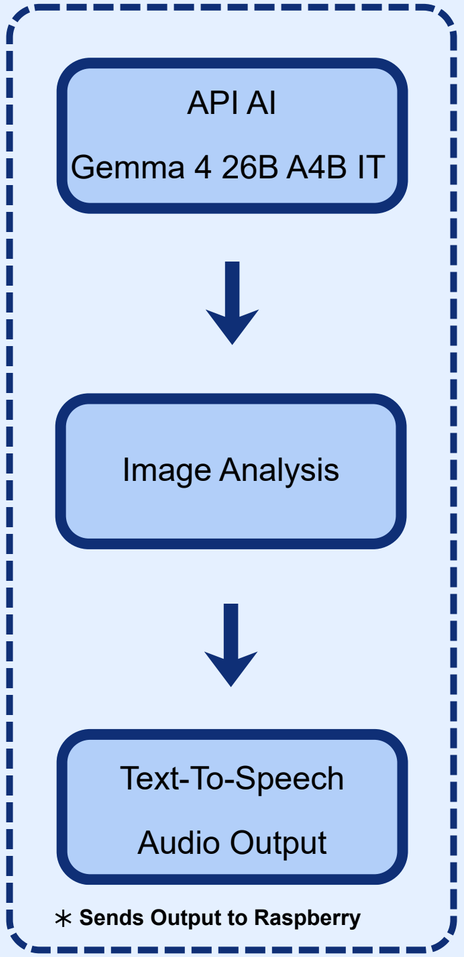
“To get to room V1.13 to V1.10, go to the hallway in front of you, to your left. To get to room V1.09 to V1.06, turn right.”

ARCHITECTURE

Wearable Architecture



Cloud Architecturte



TEAM MEMBER'S CONTRIBUITION

Member/Task	Submission of the revised project proposal	Team's website and blog	Connection with Associations Via email	List of solution requirements	List of materials for the prototype	Intermediate presentation	Pitch Deck	Video	Poster
Miguel Santos	X	X	X	-	X	X	X	X	X
José Santos	X	-	-	X	-	-	-	X	X
Pedro Vilhena	X	-	-	X	X	X	X	X	X
Iderley Costa	X	-	-	X	-	-	-	-	X
Ricardo Plancha	X	-	X	X	X	X	X	X	-
Alberto Leitão	X	-	X	-	-	-	-	-	X

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Video

WebSite